to an equalisation of their division in the entire mass of iron, and therefore also present at the place from which the permeation by the protoxide of iron takes place, namely the contact surface of metal and slag. Here, the reducing agents and free iron protoxide in the fluid state come into contact with each other at a temperature which produces mutual reaction.

The latter, therefore, favours the slag covering, keeping aloof the oxygen of the gases of combustion from the reducing agents in the iron, or indeed only permits it reaching it in quite inconsiderable quantities. It enables, therefore, their effort at combustion only to be satisfied if they can take out oxygen from the different oxides present in the slag. On these grounds forces must enter into the furnace which admit of oxidation processes for the reducing agents in the metal and reduction processes for the dissolved oxide content in the slag taking place, and thus also an effort at arriving at a state of equilibrium between the metal and slag. ' The reducing agents which are capable of hindering the entry of protoxide of iron into the metal are again carbon, silicon, phosphorus and manganese. Their products of oxidisation, as already remarked, are carbon monoxide (which simultaneously with its formation escapes from the bath), further silicic acid, phosphoric acid, and manganese protoxide, which are taken up by the slag. From the mutual inter-reaction of the elements named on the oxides present in the slag entirely, all processes which take place in the open-hearth furnace, and render possible the production of steel, are explained.

(e) THH ELIMINATION OF IMPURITIES FROM IRON AND "RETENTION OF TIIKIR PRODUCTS OP OXIDISATION IN THK SLAG.

The elimination of the four impurities of the iron, Si, Mn, P and C, is brought about by means of oxygon combined with iron, and it occurs in acid as well as in basic furnaces, giving rise to the appearance of the same products, namely the silicates and phosphates of iron and manganese, and carbon monoxide. The first-named products of elimination remain